





# Green Facts

## Ontario's Air Quality Index

The Air Quality Index (AQI), introduced in 1988, currently measures and reports on five key urban air pollutants: carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>), ozone (O<sub>3</sub>), and fine particulate matter (PM<sub>2.5</sub>). In communities where odours may be an issue, total reduced sulphur (TRS) compounds are also measured and reported. Improvements to the AQI were made in August 2002, when Ontario added PM<sub>2.5</sub> to its AQI - the first Canadian province to do so.

This brochure explains what these pollutants are, where they come from, and what effects they may have on the environment and on human health.

The Ontario government's automatic air monitoring stations constantly analyze the quality of our air. The data results are translated into an AQI value that helps Ontarians understand the level of air pollution. AQI values are posted on the Ministry of the Environment's air quality Web site at [www.airquality-ontario.com](http://www.airquality-ontario.com), and are often reported by Ontario media outlets.

### What is a Smog Advisory\*?

The Ontario Ministry of the Environment issues smog advisories when widespread, elevated and persistent smog levels are forecast due to elevated ground-level ozone and/or fine particulate matter. During an advisory, Ontarians are encouraged to limit activities which contribute to air pollution, such as unnecessary trips in the car, using their

gas-powered lawn mowers, etc. People with respiratory and heart problems are also encouraged to limit their outdoor activities, if necessary.

### Carbon Monoxide

#### CO

Automobile emissions are the primary source of this colourless, odourless, tasteless gas. CO enters the bloodstream and reduces oxygen delivery to the organs and tissues. People with heart disease are particularly sensitive. Exposure to high levels is linked with impairment of vision, work capacity, learning ability and performance of difficult tasks.

### Nitrogen Dioxide

#### NO<sub>2</sub>

NO<sub>2</sub> is a reddish-brown gas with a pungent and irritating odour. All hydrocarbon combustion in air produces oxides of nitrogen (NO<sub>x</sub>), of which NO<sub>2</sub> is a major product. NO<sub>2</sub> can irritate the lungs and lower resistance to respiratory infection. Sensitivity increases for people with asthma and bronchitis. NO<sub>2</sub> chemically transforms into nitric acid and, when deposited, contributes to lake acidification. Nitric acid can also corrode metals, fade fabrics, degrade rubber, and cause substantial damage to trees and crops.

*\* Ontario has a two-tiered smog alert program. A Smog Watch (introduced in 2000) is issued when widespread elevated smog is forecast within the next three days. A Smog Advisory is issued when widespread elevated smog is likely to occur within 24 hours.*

## **Sulphur Dioxide**

### **SO<sub>2</sub>**

SO<sub>2</sub> is a colourless gas that smells like burnt matches. Smelters and utilities (especially electricity generation) are primary sources of SO<sub>2</sub>. Other industrial sources include iron and steel mills, petroleum refineries, and pulp and paper mills. Health effects caused by exposure to high levels of SO<sub>2</sub> include breathing problems, respiratory illness, changes in the lung's defenses, and worsening respiratory and cardiovascular disease. People with asthma or chronic lung or heart disease are the most sensitive to SO<sub>2</sub>. The pollutant also damages trees and crops. SO<sub>2</sub>, along with nitrogen oxides, are the main precursors of acid rain, a phenomenon that contributes to the acidification of lakes and streams and the accelerated corrosion of buildings.

## **Total Reduced Sulphur**

### **TRS**

TRS compounds produce offensive odours similar to rotten eggs or cabbage. Industrial sources of TRS include the steel industry, pulp and paper mills, refineries and sewage treatment facilities. Natural sources include swamps, bogs and marshes. TRS compounds are not normally considered a health hazard. Some people may experience nausea or headaches being exposed to very high TRS concentrations.

## **Ozone**

### **O<sub>3</sub>**

O<sub>3</sub> is a colourless, odourless gas and a major component of smog. Ground-level ozone is not emitted directly into the atmosphere. It results from photochemical reactions between oxides of nitrogen (NO<sub>x</sub>) and volatile organic compounds (VOCs) in the presence of sunlight. O<sub>3</sub> irritates the respiratory tract and eyes. Exposure to high levels of O<sub>3</sub> results in chest tightness, coughing and wheezing. People with respiratory and heart problems are at higher risk. O<sub>3</sub> causes agricultural crop loss and noticeable leaf damage in many crops, garden plants and trees.

Note: Ground-level ozone (O<sub>3</sub>) should not be confused with stratospheric ozone. Ozone in the stratosphere (15 to 50 km above the Earth's surface) is naturally created and screens us from harmful ultraviolet radiation. Ground-level ozone (described above) is harmful to plants, animals, and humans.

## **Fine Particulate Matter**

### **PM<sub>2.5</sub>**

Particulate matter is the umbrella term used for a mixture of solid particles and liquid droplets in the air. This includes aerosols, smoke, fumes, dust, ash and pollen. Fine particulate matter (PM<sub>2.5</sub>) is particulate matter that is 2.5 microns and less in diameter. It is also known as respirable particulate matter, because it penetrates the respiratory system further than larger particles. People with asthma, cardiovascular or lung disease, as well as children and elderly people, are considered to be the most sensitive to the effects of fine particulate matter. PM<sub>2.5</sub> is also responsible for environmental impacts such as corrosion, soiling, damage to vegetation and reduced visibility.

The Ministry of the Environment (MOE) provides daily AQI readings and smog forecasts for areas across Ontario on the Web site [www.airqualityontario.com](http://www.airqualityontario.com). Daily AQI values are also available from the MOE by calling 416-246-0411 in Toronto or toll free at 1-800-387-7768 (English) or 1-800-221-8852 (French).

For more information on air quality issues or additional copies of this brochure, please contact the MOE's Public Information Centre at 416-325-4000 or toll free (from outside the 416 area) at 1-800-565-4923, or visit us at [www.ene.gov.on.ca](http://www.ene.gov.on.ca). For more information on Drive Clean, call 1-888-758-2999 or visit the Web site [www.driveclean.com](http://www.driveclean.com).



